PANEL MULTIPLE BANKS
PIECE-PART DATA AND REPLACEMENT PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of panel multiple banks (1,2,3,4,5,6,7,8,15,16,17,18, and 28 types). It also covers approved procedures for replacing these parts.

1.02 This section is reissued to reinstate the piece parts for the die-cast guide combs and to include the Nos. 8F, G, H, J, and K and D-172433 and D-172434 panel banks. Detailed reasons for reissue will be found at the end of the section.

1.03 The following is a list of the various panel multiple banks and the types of frames in which they are used.

Type of Bank	Type of Frame
1 and 2	District, Office, Incoming and Final
3	Line Finder
4 and 5	Key Listening and Position Distributing "B" Sender and Link
6	Translator (Hunting Bank)
7	Translator
8	Line Finder, Intercepting Trunk Finder
15,16 and 17	Link
18	Tandem Translator
28	Call Distributing "B" Link

1.04 Part 2 of this section covers the piece part numbers and the corresponding names of the parts which it is practicable to replace in the field in the maintenance of these panel multiple banks. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the variations of the different parts. This information is called "Piece Part Data".

1.05 Part 3 of this section covers the approved procedures for the replacement of the piece parts listed in part 2. This information is called "Replacement Procedures".

1.06 The front of the bank is determined by the code number stamped at the lower left-hand corner.

1.07 In general, before making replacements of any part of the apparatus covered herein, make the associated circuit busy in the approved manner.

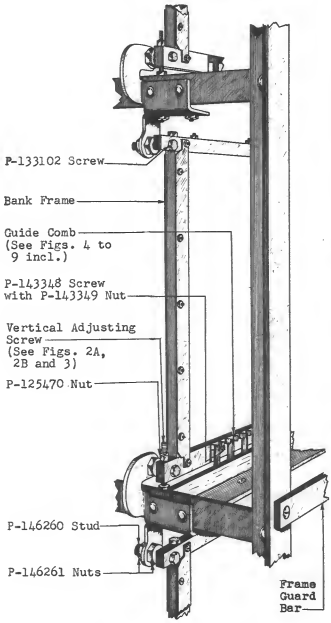

Fig. 1 - General Piece Part Information

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Fig. 2A - P-125097 Screw
Used on 3 Type Banks - Order P-172019 Screw if Space and Location of the Cross Members Permit

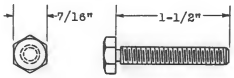

Fig. 2B - P-172019 Screw
Used on 3, 8 and 28 Type Banks

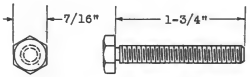

Fig. 3 - P-159601 Screw
Used on 1,2,4,5,6,7,15,16, 17 and 18 Type and D-172433 and D-172434 Banks

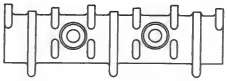

Fig. 4 - P-154590 Guide Comb
Used on 4 Type Banks

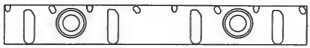

Fig. 5 - P-154634 Guide Comb (12 Prong)
Used on Nos. 3C, 8C, 8H and 28 Type Banks

Fig. 6 - P-154633 Guide Comb (9 Prong)
Used on Nos. 3C, 8C and 8H Banks

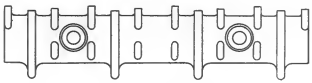

Fig. 7 - P-146296 Guide Comb
Used on 5 Type Banks

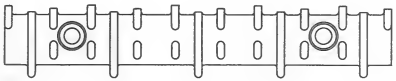

Fig. 8 - P-143350 Guide Comb
Used on 1,2,7 and 18 Type and D-172433 and D-172434 Banks

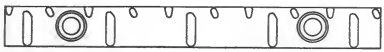

Fig. 9 - P-154219 Guide Comb
Used on Nos. 3A, 3B, 8A, 8B, 8D, 8E, 8F, 8G, 8J and 8K Banks

2. PIECE PART DATA

2.01 The figures included in this part show the various piece parts in their proper relation to other parts of the apparatus. The piece part numbers of the various parts are given together with the names of the parts as listed by the Western Electric Company Merchandise Department. Where these names differ from those in general use in the field the latter names in some cases are shown in parenthesis.

2.02 When ordering parts for replacement purposes, give the piece part number as well as the name of the part. For example: "P-133102 Screw". Do not refer to the BSP number or to any information shown in parenthesis following the piece part numbers.

3. REPLACEMENT PROCEDURES

3.01 List of Tools, Gauges and Materials

Code or Spec.No.	Description
Tools	
230 (Use Optional) (2 Required)	Multiple Bank Carrier
240	Scriber
245 (2 Required)	3/8" and 7/16" Hex. Open Double End Flat Wrench
417A	1/4" and 3/8" Hex. Open Double End Flat Wrench
555A (or the replaced 220)	3/16" Hex. Single End Socket Wrench
R-2528	Multiple Bank Strap Cutter
R-5850 (2 Required)	5/8" and 3/4" Hex. Double End Flat Offset Wrench
R-6770	3" Screwdriver Slotted ←
KS-8097	5/8" and 7/16" 12 Point Offset Box Wrench
-	4" Regular Screwdriver ←
Gauges	
61 (Use Optional) (2 Required)	Multiple Bank Resetting Gauge
-	Outside Calipers with Solid Nut-L. S. Starrett Company's No. 79 (or equivalent)
Materials	
-	Frame Guard Bar
-	Piece of Canvas
-	RM-644743 Cable Butt Lacquer
-	Twine
-	Block of Wood, Size 3" x 1/2" x 1/2" (Special for Zero Bank)

General

3.02 Inspect the new bank to be installed before the replacement work is undertaken in order to insure that the bank is in proper mechanical condition and meets the requirements for terminal spacing, etc.

3.03 Before any soldering or unsoldering is done, place a canvas cloth where it will protect the banks below and the clutches from dirt or bits of solder.

3.04 Do not disturb the horizontal adjusting stud lock nuts and the horizontal adjusting studs during the replacement work since their position is carefully set at the time of installation and the new bank will, in general, assume the correct position without any change in the horizontal adjustment. In some cases due to interference of cabling it may be necessary to remove some of the end elevator rods to permit the removal of the bank.

3.05 When necessary to replace a bank, the replacing bank should be so mounted in the frame that it assumes the same position as regards the front of the bank that the replaced bank occupied.

1, 2, 7 and 18 Type Banks ←

3.06 General: Before removing a bank from the frame proceed as follows: When checking a bank without the use of a gauge proceed as outlined in 3.07 and when using the No. 61 gauge proceed as outlined in 3.08 to 3.18, inclusive.

Checking Alignment and Location of Bank Without No. 61 Gauge

3.07 Note carefully the vertical location of the tip or ring springs and the amount of brush intrusion on the reference terminal and also on the 5th terminals from the top and bottom of the multiple brushes on the end selectors of both the front and

rear of the bank. Then remove the bank as outlined in 3.19 to 3.23 inclusive and substitute a new bank as outlined in 3.24 and 3.25. In general, a bank can be substituted and adjusted by noting the above conditions carefully and adjusting the new bank to the same conditions.

Checking Alignment and Location of Bank Using No. 61 Gauge

3.08 The object of this gauge is to obtain two fixed points of a mounted multiple bank with reference to the elevator rods assembled in the frame so that the bank can be removed and later placed again in its former position or replaced by a new bank by means of the reference points previously established. In a hundred line bank, these two points are usually the 5th terminal from the top on one end of the bank and the 5th terminal from the bottom on the other end of the vertical rows of terminals corresponding to the elevator rods used in connection with the No. 61 gauge.

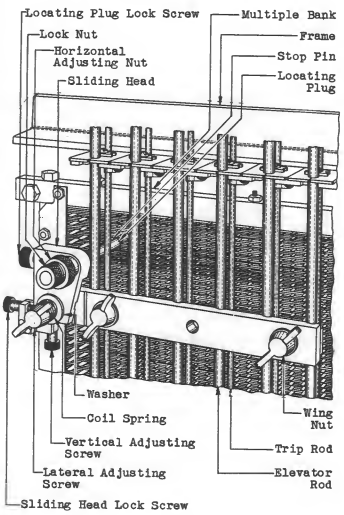

Fig. 10 - Method of Using a No. 61 Gauge to Establish a Reference Point in Relation to Elevator Rods

3.09 To prepare the No. 61 gauge for mounting on the elevator rods proceed as follows. Loosen the locating plug lock screw with the fingers and draw back the locating plug until the stop pins touch the sliding head and then tighten the lock screw to hold it in place. Remove the clamps from the gauge base.

3.10 Lock the sliding head to the gauge base by the sliding head lock screw operating through the washer and coil spring. Then release the sliding head lock screw about half a turn from its full clamping position so that the sliding head is now held against the gauge base by the pressure of the spring and can be set in any position by means of the vertical and lateral adjusting screws. It should be set in approximately a central position, permitting an equal amount of adjustment in all directions.

3.11 Locate the gauge base in front of the elevator rods and then move it vertically along the elevator rods until the end of the locating plug when pushed forward comes approximately within the space between the 5th and 6th terminals from the top and bottom. Then clamp the gauge in position as shown in Fig. 10.

3.12 The clamps are normally placed six elevator rods apart, but provisions are made to shift one of the clamps to the center of the gauge base, thereby clamping on two adjoining pairs of elevator rods. This makes the gauge available for partially equipped frames having a minimum of four elevator rods. Also, the center position may be used for a third clamp in case it is found that this adds to the rigidity when placed in position on a fully equipped frame.

3.13 To make the final vertical adjustment, slide the locating plug to a point where the end is approximately .010" from the ends of the multiple bank terminals and lock it in position with the locating plug lock screw. Then shift the sliding head by means of the vertical adjusting screw to such a position that, when the elevator rods are sprung forward slightly by hand, the small end of the locating plug will enter freely between the two terminals.

3.14 To obtain the final horizontal adjustment sight vertically along the row of terminals in which the locating plug has entered. Since the diameter of the small end of the plug corresponds to the width of the terminals, the coincidence of the two can be readily determined. Make any necessary changes in the position by adjusting the lateral adjusting screws. It is necessary when this reading is taken that the plug be held in position by the lock screw. Otherwise, the clearance between the plug and the bearing would permit enough play to make the adjustment uncertain.

3.15 Next, loosen the locating plug lock screw and fix the vertical plane of the bank by setting the horizontal adjusting nut against the sliding head at a point where the shoulder of the locating plug just rests on the ends of the two terminals between which the reduced portion of the plug has entered. Apply as little pressure as possible to avoid springing. Then lock the horizontal adjusting nut in its position with the lock nut on the end of the locating plug.

3.16 The locating plug is prevented from turning on account of its key-way engaging the reduced end of the locating plug lock screw which acts as a key. This permits the horizontal adjusting nut to be set up without turning the plug, but take care not to screw the lock nut down too hard as it has a tendency to draw the plug back from its position against the terminals of the multiple bank.

3.17 Make a final check by drawing the locating plug back and then bringing it forward again to its stop. Clamp it in this position and test by slightly springing the elevator rods to determine whether the shoulder of the plug is resting on the terminals as before.

3.18 Locate the second gauge on the opposite end of the bank in the same manner. Draw back the two locating plugs against their stop pins and hold them by the locating plug lock screws. Remove the bank as outlined in 3.19 to 3.23 inclusive.

Removal of Bank

3.19 Unsolder all leads to the multiple bank terminals. Exercise care so that the leads can be resoldered to the new bank in the proper order. Determine from which end of the frame it will be convenient to remove the bank and tie the local cable with a piece of twine so that the bank will readily pass it as it is removed.

3.20 Remove the four bank mounting screws at the four corners of the bank with the KS-8097 wrench. Do not touch the vertical adjusting screws, the vertical adjusting screw lock nuts, the horizontal adjusting studs or the horizontal adjusting stud lock nuts. Place a spare frame guard bar under the entire length of the bank letting it rest on the cross pieces which normally support the vertical adjusting screws and slide the bank out of the frame supporting it on the frame guard bar. Exercise care not to snag the multiple brush springs.

3.21 Special for Zero Bank: On zero banks where there is no cross member to support the frame guard rail, a block of wood, size about 3" x 1/2" x 1/2", may be used to support the bank as it is being removed from the frame.

3.22 Use of No. 230 Multiple Bank Carrier: If it is found convenient, use may be made of one or two No. 230 multiple bank carriers as shown in Fig. 11 to support the bank while removing or replacing it in a frame.

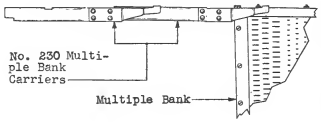

Fig. 11 - Method of Using No. 230 Multiple Bank Carriers

3.23 After removing the bank from the frame carry it to a table or work bench and then caliper the distance from the bottom of the vertical adjusting screws at each end to the top of the bank frame as shown in Fig. 12. Set the vertical

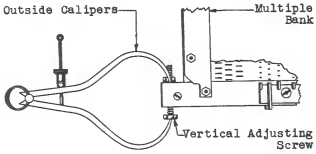

Fig. 12 - Method of Using Outside Calipers In Obtaining The Position of Vertical Adjusting Screws

adjusting screws of the new bank to as nearly as possible the same setting, using two No. 245 wrenches, one to hold the vertical adjusting screw and the other to tighten the lock nut. Check this adjustment to within .001" if possible.

Note: On some banks the vertical adjusting screws are inverted as shown in Fig. 13. In general, in order to obtain the same vertical adjustment with the new bank as

was present with the old, the position of the vertical adjusting screws on the new bank should be the same way as they were in the replaced bank. However, should space considerations and the condition of the cross members be such that the method outlined above can be used, it is well to do so in order to give a firm "seating" to the adjusting screws. In this case use the No. 417A wrench to turn the vertical adjusting screw.

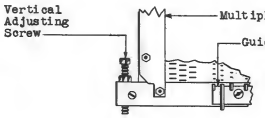

Fig. 13 - Position of Vertical Adjusting Screws on Earlier Design Banks

Installation of Bank

3.24 Install the replacing bank in a manner similar to the removal of the replaced one making sure that the code number comes on the same side of the frame. Reinsert the four bank mounting screws and tighten them moderately tight. Now check the position of the bank by comparing the adjustment of the multiple brushes on the four end elevator rods or by use of the No. 61 gauges if they are in place. Make minor adjustments to get the correct vertical position by changing the location of the vertical adjusting screws slightly. Check the amount of brush intrusion. In general, this will be found correct. However, should it become necessary to change the horizontal adjustment, slightly loosen the horizontal adjusting stud lock nuts with the R-5850 wrench and adjust the horizontal adjusting stud slightly with another R-5850 wrench. Tighten the horizontal adjusting stud and lock nut and also the bank mounting screws.

3.25 Resolder all leads in their proper order. In some cases it may be necessary to apply cable butt lacquer to the extreme ends of the leads to prevent fraying of insulation. Make electrical tests of all circuits involved in order to insure that the leads are in their proper order.

3 and 8 Type Banks

3.26 Before attempting to replace these banks, it will be necessary to raise the multiple brushes above the bank and also to lower the bank before attempting to remove it. This is necessary to prevent snagging of the multiple brush springs.

3.27 Proceed as outlined in 3.07 and 3.19 or if the No. 61 gauge is used proceed as outlined in 3.08 to 3.19 inclusive.

3.28 Scribe the position of the multiple brushes on all of the elevator rods with the No. 240 scriber and then loosen the multiple brush clamping screws with the No. 555A wrench. Raise the elevator rods and brushes as high as they will go and fasten the brushes in the raised position. In some cases, this may not give enough clearance and it will then be necessary to unsolder the multiple brush leads. An alternative way of doing this would be to lower the stop collar. However, this usually necessitates loosening the commutator brush assembly in order to prevent it from hitting the top commutator locating bracket. It is recommended, therefore, that the brushes be moved.

3.29 If the No. 61 gauges are used to check the location of these banks, it will be necessary to so locate the gauge that the reduced portion of the locating plug is flush against the top or bottom surface of the fifth or sixth terminal. This is due to the vertical spacing of these terminals being .166" instead of .125" as on most other types of banks.

3.30 Place the gauges in their proper places and also check with the calipers the exact setting of the vertical adjusting screws while the bank is in the frame as outlined in 3.08 to 3.18 inclusive and 3.23. Remove the bank mounting screws at the four corners of the bank with the KS-8097 wrench. Next lower the bank by loosening the vertical adjusting screw lock nuts with the No. 245 wrench and then unscrewing the vertical adjusting screws with the No. 417A wrench. Remove the bank from the frame guiding it by hand. Set the vertical adjusting screw of the new bank as outlined in 3.23 and put the new bank in place. Relocate the multiple brushes in their proper places using the line scribed on the elevator rod as an indication of their proper setting. Then proceed as outlined in 3.24 and 3.25.

4, 5, 6, 15, 16, 17 and 18 Type Banks

3.31 To replace any of these banks proceed as outlined in 3.06 to 3.25 inclusive with the following exceptions.

3.32 On 4, 5 and 6 type banks the brushes are always resting on the bank terminals or guide combs and it will be necessary to lower the elevator rods so that the brushes will clear the banks. To do this, remove the compensator and stop collars with the No. 555A wrench and lower

the rods. Exercise care in lowering or raising the rods since the "C" commutator spring is liable to snag on the embossed commutator code number. Also, the lug on the "Y" segment may catch on the commutator brush frame. In order to avoid this, pull the brush frame forward so that it will pass this lug.

3.33 When a 15 type bank is to be replaced, examine it and note whether it will be necessary to cut any of the straps on the replacing bank. If it is necessary, cut the straps with the R-2528 multiple bank strap cutter before mounting it in place in the frame.

3.34 On 15, 16, 17 and 28 type banks, the banks can be more readily removed by swinging them at a slight angle with the frame so as to avoid the snagging on the multiple brushes.

Guide Combs

3.35 Mark the position of the guide comb on both sides of the bank before removing it. This may be done with a sharp pencil. Remove the guide comb mounting screws with the 4" regular screwdriver while holding the nuts with the R-6770 screwdriver. Remove the guide comb and substitute a new one in position on the multiple bank. Insert the guide comb clamping screws and mount the nuts in place. Before securely tightening the clamping screws, make sure that guide comb is located correctly in a horizontal direction as indicated by the scribed lines and that it is located vertically so that the specified clearance between the guide comb prongs and the bank terminals is obtained as covered by Section 026-110-701 covering this apparatus.

REASONS FOR REISSUE

1. To add the Nos. 8F, G, H, J, K and D-172433 and D-172434 banks.

2. To reinstate P-154634, P-154633, P-143350 and P-154219 guide combs.

3. To revise the procedure for removing guide combs (3.35).

Bell Telephone Laboratories, Inc.